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Production Planning

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(Before joint meeting of Toronto and Hamilton Chapters, at Toronto, November 20, 1936)

PRODUCTION Planning infers the making of plans for Production. It involves the matching up of demand (either actual or estimated) with capacity to produce. Bad production planning means delayed deliveries, waste in manufacture through improper or poorly timed use of facilities. It means unbalanced inventories of component parts and losses finally due to obsolescence. It develops a propensity toward buck passing—and non-cooperation. It increases costs—results in purchases of unneeded machinery and material. Its effect is like a snowball rolling downhill—production is interrupted by rush demands. Machines are set up and re-set up before the job is finished. The floor is cluttered up with unfinished orders and the condition gets worse and worse until there is a new production manager appointed or complete demoralization results.

The factors involved are:

1. Determination of demand and output.
2. Dissection into parts and operations.
3. Synthesis of parts.
4. Consideration of stock.
5. Consideration of economic quantities.
6. Comparison of demand with capacity.
7. Scheduling—Start—Move—Follow up.
8. Tool requirements.
9. Material requirements.
10. Assembly orders.

In determining long range production planning we have as guide-posts the output of the past, the present trend, the seasonal effect, if any, and the estimate of the sales department as to the future. If the manufacturing cycle requires four months, then each month finds the Production Department estimating the requirements for each product in the 5th month hence.

Having arrived at such an estimate for each product manufactured, it becomes necessary to find out what must be done to attain such goals. Each product may be made up of many parts and these parts may be interchangeable between products so the common denomi-

nator in production planning becomes the individual parts. It becomes necessary to dissect requirements for product into requirements for parts—and this is sometimes an involved job because of varying quantities. An automobile has one crankshaft, but 6 or 8 connecting rods, two front wheels, four tires, thirty grease cups, and so on. So one of the first things that must be done is to multiply the number of finished product desired by the multiple of each part required.

But the same parts are required in several models, so it is important that, regardless of the parts required for one model, we must assemble the requirements of all models for each particular part and by this synthesis arrive at a parts requirement for 5 months hence, or whatever the manufacturing and procurement cycle is.

Stock on Hand

At this point consideration must be given to the quantity of stock of each part on hand. It may not be necessary to manufacture or purchase anything new. Consideration must also be given to the requirements for Service as represented by orders from the service parts stock room. Now there is either enough in stock or not enough, and if the stock is 500 shy of requirements one might think that the obvious thing to do would be to order 500.

But it may develop that with set up time and other factors taken into consideration—the minimum economic quantity to manufacture would be 1,500, so 1,500 would be ordered.

Having determined the requirements, the next thing is to fit those requirements into capacity to produce. If this means a measuring against machine shop capacity we find that it is highly desirable to know what loads are capable of absorption by each group of machines. For this purpose we have the working hours of each group which we know may be expected. Against this we have a load at present and extending to a definite future time. This load is arrived at by rating every order with its expected load for each machine group by weeks. This rating is based on the time study department ratings for every operation. Thus it is possible to schedule machine operations to occur at fairly definite dates and to look forward to seeing those dates met.

Different parts require more or less time to process. By working back from the due date when a scheduling should be completed we should be able to fit the production orders into a schedule that can be met.

Before manufacturing can be started tools must be available, so it becomes the duty of the production department to furnish sufficient advance notice to make sure that proper tools are available when needed.

The same thing applies to material.

Production of parts must be followed by Assembly. A duty of the Production Department therefore is to issue properly timed Assembly orders and the same procedure as for parts is followed.

This outline is the general plan in use in most plants where a complex product is made and where it is not possible, as in the automobile business, to assign equipment largely to one purpose for an entire season.

I. B. M. Methods

To get into detail, and still be on fairly firm ground, it may be interesting to discuss the method followed by the I. B. M. in planning its production.

First in determining our probable requirements in finished product for the 5th month ahead we must base our forecast on average monthly demand, recent trend of demand, season of year, effect of new products to be announced, and then flavor it all by probable business conditions and possible stimulus in the way of a prize contest in our sales force. We do all of this at our factory and then compare our forecast made by the sales department.

Having set up the quantity of each finished product required, a simple separation of such products into main assembly groups is made. For instance, on an alphabetic tabulator one of the main groups is what we call Base and Drive. If we had decided that 5 months from now we would need 100 alphabetic tabulators we would issue an order for 100 Base and Drive. That order card would go to the tabulating department where a deck of cards representing the Base and Drive of an Alphabetic tabulator would be selected. This deck is what we call the master deck and contains a card for each different part needed in the construction of Base and Drive, also the number of pieces of such part required for one Base and Drive. The Order Card says we need 100 Base and Drives, so we place the Order card in front of the deck and run the whole deck through the reproducing punch twice, once to produce Reservation Cards and once to produce Requisition cards. Both of these sets of cards are passed through the multiplying punch so that the product of requirements by multiples may be calculated and punched into the Reservation and into the Requisition cards. Thus, in the case of a part being used 6 times in each machine we find that we need 600 parts for 100 machines.

The Reservation cards are filled immediately into the Current Parts Stock file and the requisition cards go to the Stock Room to await release at the proper time, after which they go to the Current Parts Stock file to match out and replace the Reservation cards.

The master cards are used to make up Bills of Material, after which they are filed away and kept current with Engineering Changes until their next use.

Once each month the tabulating department makes a complete run of the Current Parts stock file. This is a combination of Old Balances and Receipts and Reservations and Purchases and Shop

orders and Disbursements, and shows Actual Inventory of each part but, more important, the Stock Available.

The Production Department is primarily interested in this column and especially in those parts which indicate a minus or "Under Available" position. At this point, when an "Under Available" item appears, it is going to be necessary to replenish the stock or else we will not be able to produce finished machines. Reference is made to a table of Economical Manufacturing quantities and it is determined how many new parts should be ordered.

The Production Department again takes a deck of Master Cards and makes up Job Tickets automatically, also Order cards for Current Stock Position file and Delivery Cards for use when order is completed. They also make a "header" card for the Cost Department file, issue Tool instructions, Raw Material Requisitions, Blueprint of Part and Operation Routing.

The Order Number is a compound of the Part number and Date of Completion expected—which latter is shown as Sequence Number. In addition to Sequence Number, which applies to the whole order, there is also "Schedule Date" which is the day that we expect the particular operation on the job card to be completed. The factory clerk, taking the Load Hours into consideration as well as the schedule date, places the operation sufficiently far ahead to insure its completion on Schedule date. Thus if schedule date were December 30th and the load 8 hours, the job could be started on the 29th or first thing on the 30th.

Remarkably little policing is necessary because each foreman knows the sequence of work to be done and if he is unable to maintain his dates, increases his force or works overtime to meet the schedule.

In determining this schedule the Production Department makes allowance for delays and works back from their dating. They must take machine load into consideration in their scheduling and endeavor to keep the capacity in the machine shop working without overload or slack periods.

In scheduling Assemblies, while the operation involves less—it is complicated by changes in quantities of finished machines wanted. As you may have suspected—our original guess of so many of this machine and so many of that are usually wrong to a degree, and at assembly time it becomes necessary to change our plans to conform to actual requirements as expressed by orders from customers.

This plan may appear complex—but in Planning Production there are many factors which must be taken into consideration. Actually the introduction of the plan of operation has been relatively easy, and the proof of the pudding is that month after month it works.

It would be a great pleasure to us at Endicott to have any of you visit us at any time, because we could show you every detail involved and make very clear to you the advantages of this method.

Society's By-laws

THE CANADIAN SOCIETY OF COST ACCOUNTANTS AND INDUSTRIAL ENGINEERS

BY-LAWS ADOPTED DEC. 11, 1936
(Effective from May 1st, 1937)

Article 1. Membership

(a) Membership in the Society shall be open to any one 18 years of age or over, who is engaged in or interested in any branch of Accounting, Industrial Engineering or Plant Management.

(b) Application for membership shall be made on the form provided by the Society and shall indicate the chapter to which the applicant desires to be attached, and shall be subject to the approval of the directors of that Chapter.

(c) The directors of the Society shall have the power to reject any applicant, or to cancel any existing membership for cause.

Article 2. Fees

(a) Membership fees shall be as follows: Regular, $15.00; Non-resident, $10.00 (available to any one residing at least 50 miles from a Chapter meeting place); Student, $5.00 (available to students actually taking courses in accountancy or business organization, and limited to a maximum of three years).

(b) The membership fee shall be payable to the Chapter, in advance on the 1st day of May in each year. A new member shall be required to pay only for the unexpired portion of the year.

(c) A member who fails to make payment of his fee within three months from the date when it is payable, shall be liable to have his membership terminated; an unpaid membership shall in any event terminate at the end of the financial year.

Article 3. Directors

(a) The affairs of the Society shall be managed by a Board of Directors which shall consist of: Not less than fifteen and not more than thirty members who shall be elected at the Annual Meeting of the Society to hold office until the next Annual meeting; the presidents of the Society for the preceding ten years who are still members of the Society; and the chairman and vice-chairman of each Chapter.

(b) In the event of a director's retirement for any cause his successor shall be appointed at the next meeting of the Board.

(c) A meeting of the Board may be held at any time at the call of the President or in his absence of the Vice-president. The president shall be bound to call a special meeting of the board on the requisition of five directors and should he fail to do so within 24 hours from receipt of such requisition they may convene a special meeting of the board. Seven clear days notice shall be given prior to the date arranged for the meeting. The notice shall indicate the nature of the business to be transacted.

(d) For the transaction of business at any meeting of the Board of directors five shall constitute a quorum. Any question arising at such meeting shall be decided by a majority of votes; in case of a tie, the chairman shall cast the deciding vote.

Article 4. Officers

(a) The Board of directors shall, at their first meeting after election, elect from among themselves a president, two-vice presidents, an honorary secretary and honorary treasurer, and shall also appoint a general secretary and such officers as the business of the Society shall render expedient from time to time, determining their duties and remuneration.

(b) The president of the Society may designate any member or members of the board in charge of some special phase of the activities of the Society, and such director or directors shall make a periodical report to the president of their work in that connection.

Article 5. General Meetings

(a) A general meeting of the Society may be called at any time, as follows: By the president; by resolution of the board of directors; by written request of at least twenty members in good standing. Such request shall specify the object for which the meeting is called. It shall be the duty of the president, or in his absence the vice-president, on receipt of such request, to cause the meeting to be arranged by the general secretary of the Society.

(b) Notice of a general meeting shall be mailed to each member of the Society at his last known address. Such notice shall state the place, time and purpose of the meeting, and shall be mailed at least 14 clear days prior to the date of the meeting.

(c) Five members present shall constitute a quorum for the transaction of business at any general meeting.

(d) Every member shall be entitled to one vote, which may be given in person or by a qualified proxy.

(e) All questions proposed for the consideration of the members shall be determined by a majority of votes; in case of tie, the chairman shall cast the deciding vote.

Article 6. Annual Meeting

(a) The fiscal year of the Society shall end on the last day of April in each year, and the annual meeting shall be held within two months thereafter at such time and place as the board shall determine.

(b) A report of the activities of the Society shall be presented at each annual meeting, together with detailed comparative information as follows: Statement of revenue and expenditures; statement of receipts and disbursements; balance sheet; supporting schedules of accounts receivable and liabilities.

(c) At each annual meeting two auditors shall be appointed by the members of the Society from among their number.

Article 7. Chapters

(a) The directors may authorize the formation of local chapters in such centres as they deem advisable, and designate the territory to be allotted to each Chapter; the directors may make such grants from the funds of the Society as they may deem expedient for the development and carrying on of chapter work.

(b) Each Chapter shall collect the fees of the members who are attached to it, and shall remit fifty per cent of said fees to the head office monthly; this remittance shall be accompanied by a statement of additions, deletions and any other changes in the membership list, certified by the secretary-treasurer and at least one other chapter director.

(c) The fiscal year of each chapter shall end on the last day of April in each year. The annual meeting of each chapter shall be held prior to the annual meeting of the Society, and not later than May 31st. Five members present shall constitute a quorum.

(d) Each Chapter shall be governed by a board of directors elected at its annual meeting, of not less than seven and not more than fifteen members. These directors shall elect from their own number a chairman and a vice-chairman. There shall also be a secretary-treasurer, or a secretary and a treasurer, who may be elected by the directors from their own number or who may be a non-member appointed by them. At each annual meeting two auditors shall be appointed by the members of the chapter from among their own number. At any meeting of directors of the chapter, five shall constitute a quorum.

(e) Each chapter, within one month after the close of its financial year, shall forward to the Society a copy of its audited financial statement in the prescribed comparative form.

(f) Each chapter shall have the right to make such regulations as may be found necessary to meet local conditions, subject always to the approval of the board of directors of the Society.

Article 8. Corporate Seal

The Society shall have a corporate seal. An impression of the corporate seal, certified by either the president, or the vice-president, and by either the honorary secretary or the honorary treasurer, shall be binding upon the Society, but the officers so certifying shall be personally accountable to the directors for the due and proper exercise of such authority.

Article 9. Signing Officers

(a) The bank account shall be kept in such bank or banks as the directors may from time to time determine; and insofar as the Society's banking business is concerned the directors are hereby authorized to exercise generally all or any of the rights or powers which the Society itself might lawfully exercise.

(b) All cheques or other negotiable instruments not requiring the use of the corporate seal shall be signed by any two of the follow-

ing: The president, the vice-presidents, the honorary treasurer, and the general secretary.

Article 10. Examinations

The board of directors shall have power to hold examinations and to issue certificates of efficiency to successful candidates.

Article 11. Amendment of By-laws

The directors may from time to time repeal, amend, or re-enact by-laws of the Society, but every such by-law and every repeal, amendment or re-enactment thereof, unless in the meantime confirmed at a general meeting of the Society, duly called for that purpose, shall have force only until the next annual meeting of the Society, and in default of confirmation thereat shall, at and from that time, cease to have force.

Article 12

All former by-laws of the Society are hereby repealed.

Value of Cost Accounting to Business Executives

By D. J. NOLAN, A.M.I.E. (Aust.)

(A Paper submitted at the Australian Congress on Accounting, Melbourne, 1936.)

Executives are, or rather should be, continuously seeking guidance and assistance in the solution of the problem of how to make more profit. The accountant who can render a service that will yield more profit will have the greatest value in industry. He should not direct his attention merely to the preparation of critical reports. He should be in a position to offer comments of a constructive nature that will direct attention to more profitable fields of operation, or to internal economies. What manager is greatly interested in balance sheets? Of necessity he feels that at regular intervals he must have placed before him the financial position of the business. Seldom does he derive from balance sheets and the statements which accompany them information of practical utility. and for that reason he cares little about them.

Management at all times will welcome guidance in the determination of profitable sales, and in the identification of prospective savings.

It is not intended in this discussion to expound the elementary principles of cost accountancy, but to demonstrate that cost ac-

countancy properly applied is of great practical value to business executives in their quest for more net profit.

In setting up a plan of cost accountancy for any given business it may be said that there are three essential points for consideration. They are:—

(a) The determination and the introduction of properly planned conditions;

(b) The correct valuation of factory services and elements entering into the cost of the finished product;

(c) The cost reports for the use of executives.

Unless each of the above points is given proper consideration, the plan will be ineffective as an aid to profit making. This applies to the small business as well as to the large business.

The Determination and the Introduction of Properly Planned Conditions

Before the introduction of a plan of cost accountancy a determination must be made of the most efficient methods of manufacture, factory routine, and the delegation of responsibility.

Staff Organisation.—In organising staff it is necessary to first fix responsibilities on a functional basis and then further to discriminate between productive work and factory services. Management should at all times aim at establishing the highest ratio possible of productive labour to factory service labour.

When productive labour and service labour have been grouped and classified according to functions it is necessary then to fix supervisory responsibilities. Firstly, in the factory there is the chief executive whose title may be that of works manager or superintendent, having with him assisting executives each responsible for one or more functions. These executives in turn have responsible to them foremen who are directly supervising the various production or service centres.

The fixing of executive responsibilities will provide those in charge of the installation of the plan of cost accountancy with a basis for the first distribution of factory costs before they are applied to products. It will also suggest the type of reports that should be prepared for each of the executives as well as for the foremen, and it will assist in the preparation of standard practice instructions for each section of the organisation.

Though the employment of staff does not come within the scope of cost accountancy, it is nevertheless one of the functions which the Cost Accountant is sometimes called upon to organise. In doing so he would be well advised to arrange for some properly trained person in the organisation, of higher ranking than a foreman, to engage and dismiss staff.

Plant Organisation.—A condition greatly in favour of low operating costs is a well-organised factory. In many instances the plant

is arranged without any thought as to handling costs, conveniences or expansion. Under such circumstances then production costs must be high. Although the Cost Accountant will probably have no authority to remedy such a condition, he should endeavour in his reports to emphasise the effect it is having on the costs of production.

A sound knowledge of the working of machines is of assistance to the Cost Accountant in determining the plan which he will employ in apportioning factory expense to products, and in the reports he will prepare on the machine performances. With some machines he may find it better to group their cost in a departmental rate. With others he may find it better to introduce machine rates. It is not possible to make recommendations which will have general application. In each instance a separate study of associated conditions is necessary. Even in the same industry one may find it desirable to introduce different plans for each factory. The plan introduced will be largely governed by the size of the business, the clerical staff available, the capacity of the executives to interpret the data, and the capital invested in the plant itself. If the investment is small then it may be convenient and reasonably accurate to apply associated costs in one departmental rate. If the investment is large then separate operating and machine rates may be desirable.

One valuable adjunct to the plan of cost accountancy is the Plant Record. Each machine should have a separate card or ledger to show its origin and the initial capital expenditure associated therewith. Each year in space provided on the card should be shown the amount of depreciation that has been written off. In another space should be shown the monthly charge for repairs and maintenance. With many businesses the Plant Record is not appreciated as it should be. It is frequently regarded as a refinement of factory control necessary to larger organisations. It is suggested, however, that every business irrespective of size should use this Record, for a detailed analysis of repair charges on the various machines will provide considerable enlightenment as to where large sums annually are being wasted.

Part of the control of costs associated with plant should be the fixing of a budget for repairs and maintenance. No one can budget, of course, for a breakdown, but it is possible to budget for the usual repairs and maintenance costs of each of the machines and operating centres. Unless this is done there is always a tendency to extravagance in that particular service. Those responsible for maintenance should be acquainted with the details of the budget and should be given some inducement to keep the costs within the budgeted figures. In businesses that have a large number of machines, maintenance may become one of the greatest sources of

waste through faulty, irregular and excessive servicing of plant, and it is for the Cost Accountant to devise a plan that will keep the maintenance engineer continuously informed of the budgetary position.

The handling of material is also a feature of cost accountancy that should not be overlooked in the costing of factory services. In most factories handling costs are out of proportion to the value of the article handled. Analysis by the Cost Accountant may reveal that an investment in suitable handling facilities such as trucks, hoists and conveyors would show a saving very much greater than the operating costs of the conveniences themselves. The practice of linking all handling costs with productive labour frequently blinds managements to the existence of an excessive expenditure that would not be tolerated if it were given prominence as a service cost.

Plant and Staff Performances.—Today no plan of cost accountancy should be considered of much value unless it is based on data compiled from time and motion studies. Amongst other things, the purpose of these studies is to determine the time that should be taken on some task by an employee of reasonable skill. In fixing the time allowance provision must be made for a reasonable number of stoppages and for fatigue on the part of the worker. It should then be expected that the majority of workers engaged upon the task will perform it within the time allowed.

Until the development of the more modern plans of cost accountancy the practice was to accept the actual time expended on any task as being essential time. When time studies are introduced all irregular time elements are discovered and it then devolves upon managements to institute a routine that will ensure the work being properly carried out within the time allotted for each task.

Time studies and motion studies provide a most intimate examination of factory methods. The practice of charging all expended time to some product only for the reason that the employee has expended that time, is dangerous, not only because it misleads the sales organisation by supplying it with wrong figures for the manufactured cost, but it also conceals wastage in labour which with effective control may be saved.

A further advantage accruing from time and motion studies is the development of wage plans with incentive features. There are as many arguments advanced against these plans as there are arguments in their favour, and it is not intended in this discussion to express an opinion on them one way or the other. However, if it is found desirable to introduce incentive plans, the information which time and motion study provides will form a basis for fixing a scale of remuneration that will not be questioned by employees because of its apparent absurdities. Such questioning is common

with the piece work plans that are developed after informal conferences with foremen.

It may be stressed that as a body, foremen have a very inaccurate knowledge of the times required for each task in the various operations. It is questionable whether this knowledge should be expected of them. Those who have any understanding of factory practice will readily understand that a foreman, with his daily supervision and attention to the ever-present problems of his department, has little opportunity to systematically examine operating times and methods. An executive who allots these duties to a foreman has no understanding of the work involved in studying operating times and methods. Foremen must be regarded as supervisors of the planned conditions which have been introduced into their department. To expect more of them is unreasonable and results in preventable losses being incurred.

As well as being made of the work performed by employees, time studies should also be made of the performances of the various machines. These studies should extend to an analysis of the time essential to the preparatory work on, or the set up of the machines before running time commences. The study should also extend to output under varying speeds, conditions and quantities. It should include records of wastage such as spoils and rejected parts. From such data permanent cost data may be established. Such data is indispensable in the preparation of cost sheets for estimates for the use of the sales department and as a standard with which to compare actual performances.

Time and motion studies should be made by persons who have been well trained in the work. They should be disinterested in the results and in no way should be subjected to the influences of affected persons. They should have an understanding of factory practice and if equipped with an engineering knowledge they will have greater aptitude for the work. Lastly, and perhaps the most important feature of the time study man, is that he should have an engaging personality, one that will win the confidence and the goodwill of those with whom he is working and whose methods he is studying, for the co-operation of the employee is indispensable to the success of the installation of planned conditions.

Specifications.—Properly prepared specifications are a further instance of the determination of planned conditions. There are two main kinds of specifications—those applying to raw materials and those to the finished products. The former are known as Raw Material Specifications and the latter as Manufacturing Specifications.

Raw Material Specifications are again themselves of two kinds —namely, those that form part of the finished products, and those required for factory services. It will be appreciated that there are possibilities of considerable disorganisation when there is no stand-

ard of quality for raw materials or for the goods manufactured. There is also the risk of loss of goodwill when customers are not certain that the orders which they have placed will conform to samples or to previous deliveries.

Frequently it is left to foremen and others to determine from their personal experience the material most suitable to the task. With the use of written specifications, however, there can be no doubt in the buyer's or seller's mind as to the quality of the goods ordered.

In the manufacturing processes, if specifications have been completed in a manner similar to those required for raw materials, there will be no misunderstanding on the part of the factory staff as to the standard of quality required.

Raw Material Specifications are held by the foremen, the engineering staff and buyers. Manufacturing Specifications are held by the estimating department, costing department and production planning department.

Manufacturing Specifications will show the quality and quantities of the raw material, and thq allowances for wastage in the various manufacturing processes. They will also show the various operations through which the product will pass in its manufacture, the class of labour to be employed, and the time allowed on each operation. No values are shown, as they are likely to change frequently.

Specifications provide the costing department with data with which to compare the actual consumption of materials and expended times in manufacture with the corresponding standards. As Manufacturing Specifications show that definite quantities of raw material are required to produce definite quantities of finished products any variation therefrom must be regarded as waste attributable to some controllable cause. When developing a cost accountancy plan the Cost Accountant should not include material wasted as part of production costs and the executive reports should be so designed as to clearly reveal such waste.

Production Planning.—Production planning enables material, labour and factory facilities to be determined in advance of actual requirements. The production planning department provides the authority so that the factory may proceed with a given quantity of work, stipulates how the work should be performed and provides estimates of quantities of material and the time necessary when specifications for new work are being prepared. It is also the department to make promises to customers as to when work will be delivered.

In a well-organised business sales forecasts are indispensable. The buying department uses these forecasts as a guide to the purchase of raw materials. The production planning department uses them in the engagement of staff, and in the organising of plant

facilities. As there must be complete co-operation between the executives controlling sales and production, the sales forecasts serve as an important link in this chain.

Sales executives frequently show some hesitancy in making forecasts. There is the fear that a forecasted volume may not eventuate. Unless the sales executive provides the factory executive with such forecasts there is likely to be at a later date a number of exasperated customers because of failure to deliver within the times promised. The goodwill of a business will be reflected in the manner in which promises of deliveries are kept. A sales executive will therefore greatly assist himself by providing the factory executive with a sales forecast well in advance of the time that the goods are required.

An essential consideration in production planning is the form the authority takes to the various factory departments to proceed with work. This authority is given on a production order or on a production schedule to cover a number of jobs. It should be complete in detail to allow of no misunderstanding. Nothing should be left to inference. The wording should be so complete that the persons who are entrusted with the jobs will have a clear conception of the finished article. These production orders or production schedules may need to be supported by specifications held permanently in the manufacturing centres. Particularly is this so when the work is frequently repeated. On the other hand, copies of specifications may accompany the production order or be written thereon when repetition is unlikely.

Issued at the same time or accompanying the production orders or production schedules are stock releases or schedules authorising the issue of material for the various production centres. In many factories foremen prepare requisitions of the material they require. This usually is an undesirable practice. The tendency is for storemen to release excessive quantities. Though the excess in issues may be identified at some later date on the completion of the job it is too late to permit an inspection by some responsible executive of the condition which caused the waste. The authority to release materials from the store should not come from the foremen, but from the production planning department or from some person in the office organisation who is specially entrusted with the giving of that authority. Then if wastage or spoilage occurs an immediate appeal must be made to the production planning department, otherwise the work cannot be continued. This additional release should be charged to a wastage account and not to the cost of production, as frequently happens.

As well as supplying material to production centres in advance of requirements it should also be seen that this practice is applied to essential tools. Tools should be in a satisfactory condition so that employees using them will not have unnecessary manufacturing

difficulties. In a disorganised factory the practice is to wait until the production orders are received before the foremen issue requisitions for the required material, then the employee who is to do the job will go to the tool store and get the necessary tools, he will then spend some time in asking the foreman a number of questions regarding the method of doing the job. He may even then spend some time in adjusting the tools before he can use them. All such delays must be eliminated. It must be determined what are the essentials of the manufacturing routine and such mistakes will not then occur.

In some factories the production orders or production schedules are accompanied by a form showing the various steps in the manufacturing processes, the tools to be used and their manner of use, and other essential information for the guidance of the factory staff. These forms are generally known as Routing Sheets. Their purpose is to have the determined method of manufacture rigidly observed instead of leaving it to the employees to exercise their own discretion.

Additional features of production planning are time tables, capacity tables and control boards. It is not the purpose of this discussion to describe their operation in full. It will be sufficient to mention that they form valuable aids to the smooth flow of production. They prevent the factory from being overloaded with work and overcome the disorganisation which is common when factory foremen attempt to satisfy the whims of the sales force with their unreasonable demands. They also prevent the switching from one job to another, and enable those engaged in production planning to be more definite in their promised delivery dates.

The determination and introduction of properly planned conditions is a necessary approach to any economy campaign within the factory having application also to the sales department, administration and finance. Planned conditions provide the Cost Accountant with a substantial framework on which to build a plan of cost accountancy that will be of practical utility to the various executives, and they go a long way towards overcoming indifference, frayed tempers and waste.

The Correct Valuation of Factory Services and Elements Entering into the Cost of the Finished Product

In this section it is not intended to discuss the routine forms associated with material, labour and expense but rather to deal with the principles that should be observed in the valuation of the various services rendered to production centres, and the correct valuation of the elements that enter into the cost of finished products.

In any factory, material, labour and expense are associated either with factory services or with manufactured products. In a plan of cost accountancy, it is essential that these two groups should

be separated. With factory service costs which include maintenance, power generated, the handling of materials, etc., there is a tendency to confuse direct production costs. The cost of factory services should be available for continuous examination by responsible executives apart altogether from the examination of other production costs. They should also be budgeted in relationship to varying volumes of output to permit comparisons with actual expenditure.

The distribution of the cost of factory services to production centres should be according to the use made by each centre of such services. Rough-and-ready distributions based on wages or productive hours or such other arbitrary methods should not be encouraged. Each service should be measured with all available facilities and with the guidance of the technical staff. When the costs of the production centres are being examined reliable figures will then be available on which to form conclusions.

The cost of factory services above the determined figure should not be included in the cost of production. These excesses are not essential to production and should be shown in the manufacturing account as a loss to be transferred to the general profit and loss account, against the total revenue of the business.

Production centres costs are distributed to finished goods in various ways. However, it should be recognised that losses due to excessive material consumption, time wasted and excessive costs of factory services are no part of the true cost of production. If it is necessary to use one ton of material to produce a given number of articles and for some reason an extra cwt. has to be issued to complete the required quantity, that extra cwt. must be kept separate from production costs and designated as waste.

The same principle applies to labour. Excessive time required to complete a given task must not be considered as part of the cost of performing that task.

This is fundamental—that with no variation in manufacturing methods or the prices of the elements entering into the cost of any product, the actual cost of every batch produced must always be the same.

With many cost accountancy plans goods are transferred from the factory to the warehouse at varying rates with each delivery. This week a batch may be charged at a cost of 2s. 6d. per dozen and next week a similar batch at 2s. 9d. In each instance the cost elements entering into the manufacture of the finished product are exactly the same. The actual cost is a determined figure, and any excessive consumption of material or loss of time should not affect the charge to a sales centre.

Expense.—With expense there is unlimited controversy as to what it actually embraces. This discussion is not concerned with that problem beyond this, that factory services should be charged

to production centres at determined unit values, and that expense rates and percentages which originate in production centres should be related to capacity.

Standard Costs.—In recent years this feature of cost accountancy has been given considerable prominence. There are, however, many misconceptions as to its nature and its particular purpose. The fixing of standards and using them as a guide to factory efficiency is not necessarily the same as standard costs. One can fix standards and yet not operate standard costs. For example, one can fix a standard of output for a machine and control actual performances in relationship to that standard without being concerned with values.

There is a popular belief that the purpose of standard costs is to use them for a comparison with actual costs. This belief does not suggest any understanding of the subject. Let us assume a standard cost was fixed five years ago when the market conditions of raw material were entirely different from what they are to-day, when labour was receiving a lower rate of pay and when the hours worked were longer, and when expenses were much lower. Clearly, using standard costs the standards fixed five years ago will stand to-day. If the actual costs of to-day are compared with the standard costs fixed five years ago, the gap may be so large as to make the comparison valueless. The standard costs fixed five years ago may have been, say 1s. per lb. To-day the same article may cost 2s. 9d. Nothing will be gained by comparing the 2s. 9d. with the 1s. What then is the purpose of standard costs?

As already stated, one must discriminate between standards and standard costs. Standards are bases with which actual performances may be compared. In cost accountancy standard costs are bases on which actual costs are calculated. Every factory, every sales organisation, is ultimately concerned only with actual costs. It is their relationship to prices which shows the margin of gross profit. Actual costs may be calculated without the use of standard costs but the labour involved in most cases is very protracted. If actual costs are calculated with the aid of standard costs, the clerical labour is greatly reduced and the results are more accurately and more expeditiously determined.

The predominating features of standard costs are the variations and the ratios. These are worthy of some elaboration. Those who have had experience with them realise the simplification that is introduced into the costing detail. The purpose of introducing standard costs into a plan of cost accountancy is speed, simplification, accuracy and better control, and this must not be overlooked by the uninitiated.

Variations.—In a plan of cost accountancy embracing standard costs the different variations in the actual costs from the determined

standards must be shown in the accounts. This enables attention to be focussed on matters requiring correction. The difficulty with most plans of cost accountancy is that they conceal the very information for which management may be craving.

There are different classes of variations which may be shown under three headings:—

(a) Cost variations.
(b) Waste variations.
(c) Physical variations.

The first group includes those which are more of an economic nature. They are costs over which management has no control. They include movements in market prices of raw materials, changes in industrial awards, prices of external services such as power, water, rent, rates, etc. The movements in such variations would be reflected in the cost of finished products.

Waste variations have a different origin. They are losses which management can control. They may arise from plant idleness, inefficiency of the factory operatives, or excessive consumption of material. Idleness in the factory is not necessarily the responsibility of factory executives. It may be due to faulty sales organising. On the other hand it may occur through the absence of production planning, through the tendency to leave that particular function to the discretion of foremen. Inefficiency in its turn will express itself in many ways, including over-expended time upon the allotted tasks, and in incorrect manufacturing methods. Excessive consumption of material, with which every business is faced, together with idleness and inefficiency, may become very heavy avoidable costs.

The third group—physical variations—includes changes from the predetermined standards. For example, if some chemical formula that has been determined is changed or if the plant or factory routine be altered, one must expect that it shall be recognised in the plan of cost accountancy. This usually is better done by a revision of the cost sheets.

Cost variations are proper charges against production. They are costs which should be added to or subtracted from standard costs. They should be passed on to sales departments in the charges for finished products. Waste variations are factory responsibilities. They are chargeable to the manufacturing account. To this, however, there is one exception—the cost of idleness. In a factory having production planning as a distinct function the cost of idleness may be shown in the final accounts as a sales responsibility. It definitely should not be charged to the cost of the finished goods, but should be shown as a charge against the total trading surplus from all sales centres.

Determination of Ratios.—Ratios are ascertained for two purposes, one to measure the efficiency of some performance as against a determined standard, and the other to apply to standard costs for

the purpose of converting them to actual costs. The former is used mostly in the reports supplied to the various factory supervisors. For example, with some operation the ratio of efficiency may be 1.05 to a predetermined standard of 1.00. Without the use of values such information will be a useful feature of the cost reports, which will be discussed later. The use of ratios to convert standard costs to actual will be discussed at length, so that it may be seen how valuable they become, even under conditions where it seems to be most difficult to ascertain actual costs.

In the ascertainment of ratios the first step is to make suitable classifications of material, labour and expense. With material the classifications should bring each item into well-defined groups. For example, classifications may be for sheet metal, timber, glass, fittings, etc. With labour the classifications should be made according to the production centres, and then with subdivisions according to the different classes of labour in those centres. With expense the classifications should be in accordance with the methods employed in each production department for the application of the factory expense. With each production centre there would be a determination of the method to be employed in applying expense to finished products. In some instances it may be a man-hour rate, in other cases it may be a percentage to labour, or machine rates may be introduced as well.

All purchases of raw material, as well as being classified, are re-valued at the determined standard prices. For example, material may be purchased at 6d. per yard whereas the price used in all the standard costs may be 4d. In the analysis of purchases both the actual and standard values are shown and the ratio of actual costs to standard is calculated for the total. The ratio is shown on each invoice and is recorded in the stock ledger accounts affected.

With labour the pay roll is planned in accordance with the classifications of labour. At the end of each week it should be possible to determine the number of hours worked in each classification. If the determined wage rates used in the standard costs are applied to the total hours of each labour classification, the result will be a pay roll at standard rates. The actual wages for each classification are then related to the standard wages and this relationship will be expressed as a ratio.

With expense the treatment is somewhat different. It will not be possible here to elaborate in detail the procedure that is followed with expense analysis against production centres, methods of calculating percentages of labour, unit costs, man-hour rates or machine rates. It will be sufficient to state that the determined rates or percentages on the cost sheets for the application of expense are unaltered. From time to time current actual rates are calculated and their relationship with the determined rates are also expressed as a ratio.

Application of Ratios.—The practical utility of ratios is found where the costing detail tends to be intricate and voluminous. Let us consider a condition where there are 500 cost sheets or more required for the manufacture of some machine. Every part that is made for the finished unit will require a separate cost sheet. At the same time there may be many minor assemblies of parts for which also a separate cost sheet is necessary. There would also be the cost sheet for the finished unit, which would embrace every part, giving in grand total the cost of all the material, all the labour and all the expenses in one final set of figures.

Now examine this condition where day by day the market prices of raw materials are moving quickly, labour costs altering through changes in industrial awards, cost of living adjustments, rises in wages through shortage of labour and similar movements in the cost of external services. Imagine what a task it would be to go through 500 cost sheets for one article making alterations with each variation.

On the other hand, with the use of ratios the calculation of actual costs is relatively a matter of a few moments. The cost sheets for all the parts and for the assemblies are of a standard design. On each is shown a classification for material, labour and factory expense. The standard cost of parts for each of these elements is brought forward under each of the classifications to the cost sheets of the minor assemblies. A transfer, still under such classifications, is then made to the cost sheets of the finished unit. On that final cost sheet there will be shown in summarised form the standard costs of all the material, all the labour and all the expense against all the classifications.

In the calculation of an actual cost the cost sheet for the finished unit is the only one used. Current ratios are applied to the total standard costs under each classification. The current ratios will be obtained for material from the purchase analyses, for labour from the wage records, and for expense from the re-calculated expense rates in relation to the standard rates. This routine is simple and completely effective in giving actual costs, as will be seen even under the most complex conditions.

The application of ratios to stock records should be discussed. In some plans of cost accountancy where standard costs are used the raw material is taken into the stock ledger at actual cost only. When it is issued the requisitions or stock releases are calculated both at actual cost and standard cost, the stock ledger being credited at actual cost, work in progress being debited at standard cost and the variation account being debited or credited with the difference. With other plans the purchase invoices are posted to the stock ledger at standard cost, the variation being brought into the factory ledger immediately. These variations, of course, do not enter into the gen-

eral ledger in which the purchases under all plans are incorporated at the actual costs.

When the stock ledger is operated with the actual costs of the raw materials there is a considerable amount of work in valuing every requisition or stock release at both prices. There is certainly something to be said in favour of converting the purchase immediately to the standard value so that when issues are made only the one rate, the standard rate, need be applied. As against this there is the difficulty of converting the controlling accounts from standard values to actual costs, and at times it is necessary for various reasons that this should be accomplished. The difficulty lies in determining the correct ratio to apply.

One cannot be guided by the total of variations for any period in relationship to the standard costs. If that procedure were followed an incorrect ratio may be used. This will be understood in a case where stocks are turned twelve times per annum. In the accounts kept for the variations there may be a figure shown representing large differences between standard costs and actual costs of material purchased over many months. The stock on hand at the moment, which may have been in the store only one month, may have been purchased at standard rates, and consequently there would be for that stock no ratios. The only practicable way of determining a ratio to apply to the controlling accounts for raw materials at standard values is by examining the accounts of the large quantities of the stocks on hand in the various classifications, making summaries of them, and then by inspection fixing a ratio that will be generally representative. At first glance this might appear to be difficult and to have some anomalies, but in practice it does not present problems which the suggestion may seem to create. In each classification it will be found that there are many lines that are predominating. An abstract of the standard costs and the actual costs of each of these will not be so burdensome. Though there undoubtedly will not be the same degree of accuracy as that which one uses when incorporating the purchases in the stock ledger at the actual cost, there will be this advantage, however, that the clerical duties associated with the issues of material will be very greatly reduced and there will be no inconvenience or anything misleading to the management.

With work in progress and parts manufactured the inventory methods under standard costs are different from the usual plan. In some cases each item is shown dissected for its value under each classification for material, labour and expense. At the foot of the inventory sheet when the classifications are totalled the ratios are then applied to convert the standard costs to actual. This procedure is governed by the volume of the work involved. If the classifications and the number of parts are numerous it may be too difficult. In other instances actual costs of each of the parts will need

to be calculated on the cost sheets themselves by applying ratios to the standards, the figures resulting then being used in the valuation of the inventory. Then again, if that prove too voluminous, another method is to classify the finished parts according to the various finished products, ascertain the ratio of actual costs to the standard costs at each manufacturing point and then apply ratios to each of the parts or to the work in progress of each of these groups. It is difficult to establish anything definite as to procedure, but inspection of underlying conditions will reveal which is the most practical approach to this problem.

Cost Sheets.—Some reference has been made to cost sheets, particularly those used where standard costs are part of the plan of cost accountancy. It will be as well, however, first to give some thought to the forms commonly used, particularly those in factories that are operating with plans of so-called actual costing. In the finer analysis an actual cost is only a relative figure.

If a batch of goods during one week has actually cost 1s. per lb. to manufacture, and in the next week a similar batch has cost 1s. 3d. and then in the third week a further batch has cost 1s. 2d., what is the actual cost? Does it happen to be any cost that somehow rightly or wrongly becomes associated with the finished article during any particular period? Under given conditions the actual cost of all batches is always the same. These variations in result are through the introduction of foreign elements in the form of over-consumption of material and excessive time expended which have no relationship whatever to the true cost of the finished article.

Cost sheets that are used with so-called actual costing are known to most accountants. They are of two types. In the case of one type, material as it is issued from the raw material store, labour as it is expended on the job and the expense that in some manner has been calculated as a percentage or an hour rate, are accumulated day by day on costs sheets for each job or article that is going through the various manufacturing processes. If the job takes a long period to complete, an unpleasant truth may be expressed in a total cost perhaps much in excess of a price which the business is likely to get.

The other type of cost sheet is that which has some semblance of predetermination about it. Such cost sheets are common to knitting, hosiery, boot manufacturing, and other such industries where a range of samples is prepared before the commencement of a sales season, orders being taken from the samples. The management sees the necessity of predetermining the costs which will enter into the manufacture of the various samples. To these costs, margins for gross or net profit will be added. This second type of cost sheet has something in its favour in that it is usually compiled with the aid of some data that has been previously ascertained either

through foremen or with some careful study of factory conditions. When the samples are likely to be non-recurring, there may be little gained in fixing standard costs and applying ratios. If the range is more in the nature of proprietary lines and is therefore recurring each year, then standard costs and the use of ratios will greatly simplify calculations.

The so-called plans of actual costing upon examination will be found to be of little assistance in these days of competitive conditions when so much attention to savings is essential. They reveal nothing until some time after losses have occurred, they show costs in which the management itself usually has no faith, they do not show information that managements would be glad to have, and lastly, when they are completed nobody takes much interest in them. Most manufacturers have their minds concentrated too much upon the costing of the finished goods. If they would give more attention to the control of performances and to the cost of operations and get them right, the costs of finished products would automatically look after themselves.

Transfer of Finished Goods to Warehouse or Sales Centres.—This is a subject of continuous discussion between factory managers and sales executives. Most factory managers when they have control of the cost accountancy plan attempt to transfer all factory losses to the sales centres in the cost of the finished products. Sales centres should be charged only with the proper costs which are definitely necessary to production.

When a plan of cost accountancy has been developed on principles that are known as actual costs, all completed work is transferred to sales centres at a figure representing the actual cost that has been accumulated on the cost sheet. With standard costs the sales department is given an actual cost that is recurring. Every batch that the sales department receives will be charged at the one flat rate. The differences between the flat rates and the actual costs are borne by the factory and will be shown in its own manufacturing account as surpluses or deficits for a given period.

In applying cost accountancy plans using standard costs there is a feature in connection with the transfer of finished products to sales centres that should be considered. It has been explained elsewhere that accounts for cost variations are established and that these variations should be used in adjustments of the prices that are charged to the sales centres. In other words, if material has risen by 10 per cent. in price then the prices to the sales centres should be adjusted to care for this movement. When a decrease in some cost element such as labour occurs it should be expressed in a reduced charge to the sales centre.

In the factory ledger incorporating the cost accountancy plan these variation accounts may accumulate to large figures, either as debits or credits. In the summary of the value of transfers of

finished products to the sales centres, the valuation should be made at two rates, one at the total figure appearing on the standard cost sheets and the other at an actual cost previously ascertained with the aid of ratios. The difference between the standard value and the actual will represent the total of the cost variances which has been transferred to sales centres. This amount would be offset by cost variances in the factory ledger originally established from the analysis of purchases, the pay roll, and the expenses, rates and percentages.

This is really a simple treatment but it is very effective. The accounts for cost variations will immediately show whether all alterations in purchase prices, for material and labour or expense are being charged to the cost of finished goods. The rise or fall in the variation accounts themselves indicates the extent to which the business is getting the benefit or suffering through any economic movement.

The Cost Reports for the Use of Executives

Considerable time may have been expended in the determination and introduction of planned conditions, and in the design and installation of various forms that will reveal controllable waste. Unless this preliminary work is brought to a conclusion in executive reports on which action necessary to correct faulty conditions will be taken, the business will not show the improvement anticipated.

Whatever the plan may be it will have no chance of success unless a proper enthusiasm for its use is at all times in evidence. This enthusiasm must come from the top of the organisation and be radiated in all directions. If the chief executive of the business shows no enthusiasm for the use of the cost reports that are presented to him, he cannot expect enthusiasm from each of the functional executives.

To be of value cost reports must be furnished promptly, they must be reliable and accurate, and they must be prepared continuously. All executives who receive them should know that they may expect them at regular times. They should also be of a nature that will arouse direct interest. Information over which the functional executive has no control must be excluded. If uncontrollable items are inserted, they may mislead and cause unjust criticism of other departments and of managerial policy.

Comparisons should be made of actual performances against determined standards, so that the executive responsible may have some means of gauging the progressive results of any improved control which he himself is endeavouring to introduce. Finally, the reports received by functional executives should show comments from some managing executive to indicate that the performances revealed in those reports are under his close observation.

Records of Plant and Staff Performances.—The determined

standards set for material and labour as well as for machine and staff performances should be introduced into the cost reports. The ratio or percentage of actual performance to the determined standard will indicate functional trends. The records themselves are compiled in many ways from data supplied by the supervisors of the various production or service centres.

The reports upon material may embrace the quantity of defective work, wastage in raw materials in the various operations, stock losses, including shortages and deterioration. With labour all time that is not productive should be charged to standing order numbers. In this way the lost time is dissected under various headings and may be closely scrutinised. Reports of a similar type should be prepared for factory expense, separating the fixed items from the variable. In cost accountancy the variable is related to movements in a budgeted volume, fixed items, of course, not requiring the same close attention. It will be appreciated that in all records of performances the basis of comparison should be something that is worthy and possible of attainment. For that reason then there should be considerable care with the determination of the standards.

Factory Ledger.—For the better operation of the factory ledger it is advisable to introduce some systematic chart of accounts that uses numerals or the letters of the alphabet as symbols. Such a system permits of careful classifications and subdivisions of accounts into departments and functions without the task of endeavouring to develop titles for accounts each time some new condition arises. With symbols there is little opportunity for misunderstanding. Furthermore, ledger postings, factory recordings, and all other routine work is greatly expedited. Hand-writing is reduced to a minimum and allocation of charges is much more definite.

The factory ledger does not require much labour in posting, while the data it contains is most helpful to capable executives. It is usually sectionalised to show controlling accounts for the various stocks, work in progress accounts for each of the productive centres, sub-store accounts for finished parts, loss or gain accounts for each productive centre. If standard costs are a feature of the plan there will be also accounts for variations in the purchase price of raw materials, in the cost of labour and in expense. In addition there will be waste variance accounts showing excess of consumption in raw material, labour and expense lost in production through excessive time, losses due to faulty material, rejected parts and spoiled work and such other factory losses as demand the attention of management.

The records in the factory ledger must interlock with those of the financial system. That is imperative. The interlocking feature is accomplished each month, first by incorporating in the factory ledger the manufacturing section of the trial balance of the gen-

eral ledger. Subsequent journal entries may then be made in the factory ledger without interfering with the financial accounts. Material, wages and expense may be transferred to work in progress accounts, work in progress accounts may be transferred to finished goods accounts, finished goods accounts may be transferred to sales centres, losses in operating may be carried to specific accounts for each department, budgeting features may be incorporated and losses or gains on budgets carried to accounts for that purpose. At the close of financial periods as the actual stocks are incorporated in the factory ledger as well as in the general ledger, the net result of the manufacturing account prepared from the general ledger will be exactly the same as that which will appear in the factory ledger.

Compiling Cost Reports for Executives.—There are three types of cost reports prepared for the use of executives. Those having the greater detail are prepared for the factory. The sales executive has reports presented to him showing cost of manufactured goods, cost of selling, gross profits on classified lines and departmental surpluses. The administrative reports cover financial costs and financial statistics, in addition to summarised reports upon the manufacturing and the selling.

The information that the cost reports should contain is governed by individual circumstances. In their preparation, however, it

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should be recognised that comparisons with past performances are not of the same value as comparisons with standards of efficiency or with budgets. Only then can each executive determine for himself whether the standard of efficiency which he is seeking is being attained.

Managing executives cannot be expected to examine in detail the various reports that each of the functional executives receives. They should be concerned only with summarised detail showing ratios or percentages of efficiency. Adverse movements call for a report from the functional executive. If the correction of adverse movements is not evidenced in subsequent reports, some person specially delegated to the task should closely investigate the condition in conjunction with the supervisor or foreman of the department affected.

To derive the fullest benefit from the cost reports, executive committees are sometimes formed which meet each week at regular times. These committees discuss the summaries that the cost department has prepared. From these reports they decide what adverse movements are requiring immediate attention and then institute some action which it is believed will lead to a correction.

Conclusion

In the opening passages of this discussion it was stated that management is at all times looking for guidance in the proper determination of profitable sales and in the identification of prospective savings. It was further stated that this guidance would be given with the aid of a well-designed plan of cost accountancy having as essential features:—

(a) The determination of and the introduction of properly planned conditions.

(b) The correct valuation of factory services and elements entering into the cost of the finished product.

(c) The cost reports for the use of executives.

No plan of cost accountancy is of much value unless these essentials are properly observed, and immediate action taken upon the disclosure in the cost reports of the adverse conditions that were affecting the operating costs.

It must be apparent then that the accountant who can render the services referred to must be an invaluable adjunct to business executives. With an intimate knowledge of cost accountancy it will rest with him to reveal information which in his opinion will aid management in forming correct conclusions. If his work in this particular field is supported by the enthusiasm of managing executives, there will be no doubt that the ultimate result will be expressed in considerably more net profit.

In conclusion, I desire to express my keenest appreciation of the assistance rendered to me in the preparation of this Paper by Thomas D. Hadley, of Offner, Hadley & Co.

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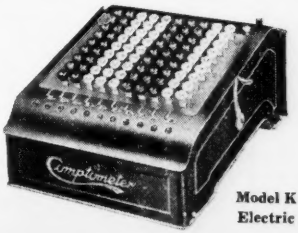

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CHAPTER NOTES

TORONTO

Toronto's meeting on Nov. 20th was one of the greatest in its history. There was not only a good turnout of its own members, but also some twenty-five from Hamilton Chapter, and a group from International Business Machines. Mr. W. F. Titus of that company spoke on "Production Planning," and left the best kind of impression on his audience. His remarks were practical, and most capably delivered. His address is summarized in this issue. Harold Wright, of Hamilton, president of our Society, occupied the chair for most of the meeting at the request of Percy Roberts, chairman of Toronto Chapter. Bruce Taylor functioned very effectively in the refreshment department. Several of the members and visitors took part in the discussion which followed the speech.

A regular meeting of the Chapter takes place on Dec. 9th, again at the Royal York Hotel, to be addressed by Professor W. S. Ferguson, C.A., of the University of Toronto and Shaw Schools, Ltd.

A week later, on the 16th, Hamilton Chapter provides a return joint meeting, and an effort is being made to have a good delegation from Toronto.

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